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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/607,767	06/27/2003	Takeshi Nishimura	4296-164 US	7413

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Diane Dunn McKay, Esq.  
Mathews, Collins, Shepherd & McKay, P.A.  
Suite 306  
100 Thanet Circle  
Princeton, NJ 08540

EXAMINER

PUTTLITZ, KARL J

ART UNIT

PAPER NUMBER

1621

DATE MAILED: 03/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/607,767

Applicant(s)

NISHIMURA ET AL.

Examiner

Karl J. Puttlitz

Art Unit

1621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/30/2005 has been entered.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-111 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 step i) recites adding polymerization inhibitors to a different columns distillation column, but it is still unclear how the columns are used in any of the steps.

In claims 2 and 13, the term "the concentration of maleic acid . . ." lacks antecedent basis.

The term "complying acrylic acid-containing liquid" in claim 1 does not make sense.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-21 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,252,110 to Uemura et al. (Uemura) in view of The Kirk-Othmer Encyclopedia of Chemical Technology, pp. 342-369, Copyright © 1991 by John Wiley & Sons, Published Online: 4 Dec 2000 (Kirk Othmer).

The claims have been amended to require obtaining crude acrylic acid by dehydration and/or removing a low boiling substance from said aqueous acrylic acid-containing solution by using.. an azeotropic distillation column.

The claims have also been amended by requiring introduction of a polymerization inhibitor to at least one distillation column selected from the group consisting of an acrolein separation column, an azeotropic dehydration column, a heavy-ends cut column, maleic acid separation column an acetic acid separation column, and a purifying column at any point except at a step for supplying a raw material which is complying acrylic acid-containing liquid to the at least one distillation column, and also at any point except the step for supplying a reflux to the at least one distillation column.

As mentioned, Uemura teaches that a production method of high purity acrylic acid normally consists of an oxidation step for producing acrylic acid through gas-phase catalytic oxidation of propylene and/or acrolein; a collection step of contacting the

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acrylic acid-containing gas with water and collecting the acrylic acid in the form of an aqueous acrylic acid solution; an azeotropic separation step of distilling the aqueous acrylic acid solution in an azeotropic separation column in the presence of an azeotropic solvent and recovering crude acrylic acid from bottom part of said column; and a purification step of purifying the crude acrylic acid. This purification step is normally conducted using a high boiling impurities separation column for removing high boiling impurities in the crude acrylic acid and optionally an acetic acid separation column for further removing acetic acid. See column 1, lines 49-63.

This patent also teaches introducing bottom liquid a thin film vaporizer into a pyrolyzing tank, decomposing acrylic acid dimer in a bottom liquid and thereafter recirculating at least a part of bottom the liquid of said pyrolyzing tank into said thin film vaporizer and/or the distillation column. See column 3, lines 36-44.

Fig.1 shows tanks in the process.

With regard to

Uemura fails to explicitly teach introduction of a polymerization inhibitor to those distillation columns listed in the claims. Also, Uemura fails to teach those embodiments wherein the acrylic acid that is converted to polyacrylic acid or esters of acrylic acid. It is for this proposition that the examiner joins Kirk Othmer. Specifically, the reference teaches that free-radical polymerization inhibitors are fed to purification units to prevent polymer formation and resulting equipment failure, see page 354. Also the reference teaches that acrylates are primarily used to prepare emulsion and solution polymers, see abstract. Accordingly, based on Kirk-Othmer, the embodiments requiring

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polymerization inhibitors and conversion to polymers are well within the motivation of those of ordinary skill, and thus, prima facie obvious.

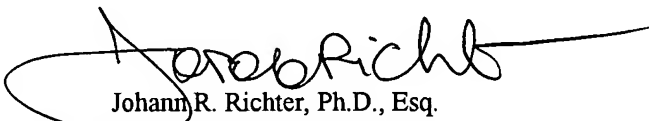
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl J. Puttlitz whose telephone number is (571) 272-0645. The examiner can normally be reached on Monday to Friday from 9 a.m. to 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter, can be reached at telephone number (571) 272-0646. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Karl J. Puttlitz  
Assistant Examiner



Johann R. Richter, Ph.D., Esq.  
Supervisory Patent Examiner  
Biotechnology and Organic Chemistry  
Art Unit 1621  
(571) 272-0646